

### CLAIMS

1. A switch mechanism for use in a power tool having a motor and at least two operable directions comprising:

a first switch having an ON and an OFF position to selectively actuate said motor;

a second switch to select between said directions, said second switch further comprising a neutral position in which neither of said directions is selected;

a first portion of said first switch being adapted to abut a first portion of said second switch when said second switch is in the neutral position and said first switch is in said OFF position; said abutment of said respective first portions preventing displacement of said first switch to said ON position until said second switch is displaced to a position other than said neutral position; and,

a second portion of said first switch being adapted to abut a second portion of said second switch when said first switch is in said ON position and said second switch is in a position other than said neutral position, said abutment of said respective second portions preventing displacement of said second switch to said neutral position until said first switch is displaced to said OFF position.

2. The switch mechanism of claim 1 wherein said second switch comprises:

an approximately inverted-U-shaped external sliding switch;

a cavity on the uppermost underside of the external sliding switch; and

an internal switch.

3. The switch mechanism of claim 2 wherein said internal switch is an approximately t-shaped sliding switch.
4. The switch mechanism of claim 2 wherein said internal switch is a toggle switch.
5. The switch mechanism of claim 1 wherein said first switch is a trigger.
6. The switch mechanism of claim 3 or 4 further comprising means to bias the external sliding switch to a centred position, said centred position corresponding to said neutral second switch position.
7. The switch mechanism of claim 6 wherein said means to bias the external sliding switch comprises one or more springs.
8. The switch mechanism of claim 7 wherein said springs are maintained in place by a connection to the external sliding switch.
9. The switch mechanism of claim 8 wherein said connection is made using one or more roll pins.

10. The switch mechanism of claim 1 further comprising a mounting mechanism to secure the switch mechanism in place, wherein said mounting mechanism comprises:

end blocks of a shape and size to snugly fit into the handle of the power tool; and

one or more pairs of rods separating the end blocks.

11. The switch mechanism of claim 1 wherein said motor is a series-wound motor.

12. The switch mechanism of claim 1 further comprising a dynamic brake wherein said dynamic brake is engaged when said second switch is in said neutral position.

13. The switch mechanism of claim 12 further comprising at least one pair of motor contacts to allow operation of the tool in each of the operable directions.

14. The switch mechanism of claim 13 wherein said second switch comprises:

an approximately inverted-U-shaped external sliding switch;

a cavity on the uppermost underside of the external sliding switch;

an internal switch;

electrical contacts extending from the lowermost surface of the internal sliding switch; and

one or more rocker contacts serving to connect the electrical contacts extending from the internal sliding switch to the motor contacts.

15. The switch mechanism of claim 14 wherein an electric current path runs through said motor, said motor contacts, said rocker contacts and said electrical contacts when said first switch is in said ON position and said second switch is positioned to select one of said operable directions.

16. The switch mechanism of claim 17 wherein an electric current path runs through said motor, said motor contacts, said rocker contacts, said electrical contacts and said dynamic brake when said first switch is in said OFF position and said second switch is in said neutral position.

17. The switch mechanism of claim 16 wherein said motor is a series-wound motor.

18. The switch mechanism of claim 17 wherein said dynamic brake comprises auxiliary windings in series with said series-wound motor.

19. The switch mechanism of claim 18 wherein said internal switch is an approximately t-shaped sliding switch.

20. The switch mechanism of claim 18 wherein said internal switch is a toggle switch.
21. The switch mechanism of claim 12 wherein said first switch is a trigger.
22. The switch mechanism of claim 19 or 20 further comprising means to bias the external sliding switch to a centred position, said centred position corresponding to said neutral second switch position.
23. The switch mechanism of claim 22 wherein said means to bias the external sliding switch comprises one or more springs.
24. The switch mechanism of claim 23 wherein said springs are maintained in place by a connection to the external sliding switch.
25. The switch mechanism of claim 24 wherein said connection is made using one or more roll pins.
26. A switch mechanism for use in a power tool with a motor and a dynamic brake and at least two operable directions comprising:
  - a first switch having an ON and an OFF position to selectively actuate said motor;
  - and

a second switch to select between said directions, said second switch further comprising a neutral position in which said dynamic brake is engaged.

27. The switch mechanism of claim 26 wherein said switches are constrained such that said first switch can move to said ON position only when said second switch is not in said neutral position.

28. The switch mechanism of claim 27 wherein said switches are constrained such that said second switch can move to said neutral position only when said first switch is in said OFF position.

29. The switch mechanism of claim 28 wherein said switches are constrained by physical abutment of a portion of said first switch to a portion of said second switch.

30. The switch mechanism of claim 29 further comprising at least one pair of motor contacts to allow operation of the tool in each of the operable directions.

31. The switch mechanism of claim 30 wherein said second switch comprises:

an approximately inverted-U-shaped external sliding switch;

a cavity on the uppermost underside of the external sliding switch;

an internal switch;

electrical contacts extending from the lowermost surface of the internal sliding switch; and

one or more rocker contacts serving to connect the electrical contacts extending from the internal sliding switch to the motor contacts.

32. The switch mechanism of claim 31 wherein an electric current path runs through said motor, said motor contacts, said rocker contacts and said electrical contacts when said first switch is in said ON position and said second switch is positioned to select one of said operable directions.

33. The switch mechanism of claim 32 wherein an electric current path runs through said motor, said motor contacts, said rocker contacts, said electrical contacts and said dynamic brake when said first switch is in said OFF position and said second switch is in said neutral position.

34. The switch mechanism of claim 33 wherein said motor is a series-wound motor.

35. The switch mechanism of claim 34 wherein said dynamic brake comprises auxiliary windings in series with said series-wound motor.

36. The switch mechanism of claim 35 wherein said internal switch is an approximately t-shaped sliding switch.

37. The switch mechanism of claim 35 wherein said internal switch is a toggle switch.
38. The switch mechanism of claim 35 wherein said first switch is a trigger.
39. The switch mechanism of claim 36 or 37 further comprising means to bias the external sliding switch to a centred position, said centred position corresponding to said neutral second switch position.
40. The switch mechanism of claim 39 wherein said means to bias the external sliding switch comprises one or more springs.
41. The switch mechanism of claim 40 wherein said springs are maintained in place by a connection to the external sliding switch.
42. The switch mechanism of claim 41 wherein said connection is made using one or more roll pins.
43. The switch mechanism of claim 26 further comprising a mounting mechanism to secure the switch mechanism in place, wherein said mounting mechanism comprises:
- end blocks of a shape and size to snugly fit into the handle of the power tool; and
- one or more pairs of rods separating the end blocks.